

Claims

- 1) An epicyclic gear transmission comprising:
 - a sun gear having a center axis;
 - a ring gear having a center axis, the ring gear center axis being coaxial 5 with the sun gear center axis; and,
 - a plurality of planet gears having center axes that are parallel with the center axis of the sun gear and the ring gear, the plurality of planet gears being spatially arranged around the sun gear, at least some of the plurality of planet gears meshing with the sun gear, and the planet gears meshing with 10 the sun gear having peripheries that are interleaved.
- 2) The epicyclic gear transmission of Claim 1, further comprising:
 - an input shaft connected to the sun gear for rotating the sun gear; and, 15 the ring gear being fixed.
- 3) The epicyclic gear transmission of Claim 2, further comprising:
 - the plurality of planet gears being mounted on a plurality of planet gear shafts with at least two planet gears of the plurality of planet gears being 20 mounted on each planet gear shaft.
- 4) The epicyclic gear transmission of Claim 3, further comprising:
 - the planet gears meshing with the sun gear being the largest planet 25 gears on the planet gear shafts.

- 5) The epicyclic gear transmission of Claim 3, further comprising:
 - at least one of the planet gears on each planet gear shaft meshing with the ring gear.
- 5 6) The epicyclic gear transmission of Claim 3, further comprising:
 - the ring gear being one of a pair of fixed ring gears; and,
 - at least two planet gears on each planet gear shaft meshing with the pair of ring gears.
- 10 7) The epicyclic gear transmission of Claim 6, further comprising:
 - the two planet gears on each planet gear shaft that mesh with the pair of ring gears being helical gears with opposite hand helical gear teeth.
- 8) The epicyclic gear transmission of Claim 3, further comprising:
 - 15 a first planet gear of the at least two planet gears on each planet gear shaft meshing with only the sun gear and a second planet gear of the at least two planet gears on each planet gear shaft meshing with only the ring gear.
- 9) The epicyclic gear transmission of Claim 8, further comprising:
 - 20 the first planet gear being larger than the second planet gear.
- 10) The epicyclic gear transmission of Claim 8, further comprising:
 - the ring gear being one of a pair of ring gears; and,

the second planet gear of the at least two planet gears on each planet gear shaft meshes with only the one ring gear and a third planet gear on each planet gear shaft meshes with only an other ring gear of the pair of ring gears.

5 11) The epicyclic gear transmission of Claim 3, further comprising:

- a carrier supporting each of the planet gear shafts for rotation of the planet gear shafts relative to the carrier; and,
- a single bearing assembly on each planet gear shaft mounting the planet gear shaft on the carrier.

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12) The epicyclic gear transmission of Claim 11, further comprising:

- the ring gear being one of a pair of fixed ring gears; and,
- at least two planet gears on each planet gear shaft meshing with the pair of ring gears, the at least two planet gears on each shaft being positioned

15 on axially opposite sides of the bearing assembly on each planet gear shaft.

13) The epicyclic gear transmission of Claim 1, further comprising:

- the epicyclic gear transmission being a rotor transmission of a rotary wing aircraft.

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14) An epicyclic gear transmission comprising:

- a sun gear having a center axis;
- a ring gear having a center axis, the ring gear center axis being coaxial with the sun gear center axis;

a plurality of planet gears having center axes that are parallel with the center axis of the sun gear and the ring gear, the plurality of planet gears being spatially arranged around and meshing with the sun gear with adjacent planet gears meshing with the sun gear being axially staggered.

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15) The epicyclic gear transmission of Claim 14, further comprising:
the sun gear being driven by an input shaft; and,
the ring gear being fixed.

10 16) The epicyclic gear transmission of Claim 15, further comprising:
the plurality of planet gears being mounted on a plurality of planet gear shafts, the planet gear shafts having center axes that are parallel with the sun gear and ring gear axis, and the axially staggered adjacent planet gears meshing with the sun gear being mounted on adjacent planet gear shafts.

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17) The epicyclic gear transmission of Claim 15, further comprising:
the plurality of planet gears being mounted on a plurality of planet gear shafts with at least two planet gears being mounted on each planet gear shaft and the planet gears meshing with the sun gear being the largest planet gears
20 on each planet gear shaft.

18) The epicyclic gear transmission of Claim 15, further comprising:
the ring gear being one of a pair of fixed ring gears; and,

the plurality of planet gears being mounted on a plurality of planet gear shafts with at least two planet gears on each planet gear shaft meshing with the pair of ring gears.

- 5 19) The epicyclic gear transmission of Claim 18, further comprising:
 - the two planet gears on each planet gear shaft that mesh with the pair of ring gears being helical gears with opposite hand helical gear teeth.
- 20) The epicyclic gear transmission of Claim 18, further comprising:
 - 10 the plurality of planet gears that mesh with the sun gear do not mesh with the pair of ring gears.
- 21) The epicyclic gear transmission of Claim 14, further comprising:
 - 15 the epicyclic gear transmission being a rotor transmission of a rotary wing aircraft.